

# Amphenol MIL-DTL-22992, Class 'L'



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### MIL-DTL-22992, Class L Connector Typical Markets:

- Power Generators / Air Conditioning Units
- Ground Missile Systems
- Military Shelters / Military Communication Centers
- Medical Units



**Product Features, Benefits and Specifications**

- High Current Capacity
- Rugged Construction
- Safety
- Serviceability



**Class L Plug and Receptacle**

Amphenol meets the demands for heavy duty & heavy power connectors with features that are critical to reliable interconnection in rugged environmental conditions. Heavy Duty Class L\* connectors are highly suitable for industrial or military applications.

- Heavy electrical loads: current range from 40 to 200 amperes
- Direct current or single/three phase, 60/400 Hertz alternating current
- Automatic grounding for safety
- Meet MIL-DTL-22992 qualification
- Resistance to the operating environments of heat, moisture, vibration, high impact and immersion - see chart below.
- Double stub coupling threads for faster connections; no cross threading, easy cleaning
- Left hand accessory threads to minimize cable twisting, wire breakage, accidental connector disassembly
- Gaskets or "O" rings at appropriate surfaces for perfect weather tight connections



**Class L Connectors on a Power Unit**

**Amphenol Heavy Duty Class L connectors have been exposed to the following environmental conditions, without compromise of mechanical integrity or degradation of electrical performance.**

Condition	Configuration	Description	Reference
Thermal Shock	Unmated	Five complete on hour temperature cycles of -55°C to +125°C	MIL-STD-1344, method 1003, test condition A
Moisture Resistance (Cable mounted connectors)	Mated	Ten complete 24 hour cycles of +25°C to +65°C temperature at 90% to 98% humidity	MIL-STD-202, method 106
Durability	Mated	500 complete mating/unmating cycles	MIL-DTL-22992
Salt Spray (Corrosion)	Unmated	48 hour exposure to atomized 5% saline solution at +35°C	MIL-STD-1344, method 1001
Vibration	Mated	10 to 55 Hz, .06 inch total excursion in 1 minute cycles for 6 hours, 55 to 2000 Hz, 10G peak amplitude sweep	MIL-STD-1344, method 2005
High Impact	Mated	Nine hammer blows from 1, 3 and 5 feet, three each in three axes on mounting panel	MIL-STD-202, method 207
Heat Rise (Class L only)	Mated	Maximum rated DC current for four hours at +25°C in still air	MIL-DTL-22992
Fluid Immersion	Unmated	20 hours immersion in hydraulic fluid and lubricating oil	MIL-DTL-22992
Water Immersion	Mated and Unmated	4 hours immersion at 1 atmosphere pressure differential	MIL-DTL-22992

Amphenol also supplies other series of heavy duty cylindrical connectors:

- QWLD Series - Military MIL-DTL-22992 qualified connectors and industrial equivalents.
- QWL Series - A more compact heavy duty design for industrial power and control applications.
- Star-Line, Star-Line EX Series - Industrial high power circulars.

See the Options/Others section of this catalog for more information on these series.

\* Amphenol Class L design is covered by one or more of the following U.S. Patent Numbers: 3,023,396, 3,221,292

38999  
III  
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**HIGH SPEED**  
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Connectors  
Cables

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Transient

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Matrix 2

83723 III  
Matrix | Pyle

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Pyle

5015  
Crimp Rear Release  
Matrix

**22992**  
Class L

Back-  
Shells

Options  
Others

### Shell Styles



The Amphenol Class "L" heavy duty connectors are the largest size cylindricals. They are available only in the specific configurations prescribed by MIL-DTL-22992 for either military or industrial applications. This rigid configuration control assures correct interconnection of electrical circuits for maximum safety and reliability. Controlled parameters include:

- **Connector shell style and contact type** - Wall mount and cable connecting receptacles are supplied with socket contacts only, and always lead from the power source. Plugs (with coupling rings) have pin contacts only, and always lead to the equipment end.
- **Shell size** - The direct relationship of shell size to current carrying capability reduces the possibility of inadequate wiring for heavy electrical loads†.

Shell Size	Current Rating (Amperes)	Contact Size
28	40	6
32	60	4
44	100	1/0
52	200	4/0

- **Keyway Position** - Four positions of the main keyway are used to discriminate between the following power sources:
  - two wire D.C.
  - two wire single phase A.C.
  - three wire single phase A.C.
  - four wire three phase A.C.
- **Insert rotation** - When carrying alternating current (A.C.), different angular rotations of the insert within the connector shell are used to distinguish between 60 Hertz and 400 Hertz circuits.

#### Design features of Amphenol Class L provide:

- **Greatest Capacity** - Current ranges 40 to 200 amps, conductor sizes 6 to 4/0.
- **Safety** - Complete protection of personnel and equipment if connectors are inadvertently disconnected under load.
- **Foolproof Mating** - Design incorporates voltage, current, frequency, phase and grounding requirements
- **Standardization** - MIL-DTL-22992 Class L insert arrangements specify connector/cable combinations for maximum reliability.
- **Serviceable Contacts** - Contacts are normally crimped to the cable before connector assembly. No insertion tools required. Bushings are available to adapt smaller diameter wires to larger contacts.
- **Arc Quenching Design** - Recessed socket contacts within the insert create an arc suppressing chamber which protects the user when connectors are separated under load.
- **Programmed Coupling Sequence** - Grounding and neutral contacts engage before power contacts.
- **Waterproof Design** - A unique combination of grommets and seals provides waterproofing in any condition - mated or unmated, capped or uncapped.
- **Rugged Construction** - Machined from high strength aluminum. Straight-line attachment of accessories eliminates possibility of cable twisting or misalignment.
- **Accessories** - Supplied with all Class L connectors as indicated on the individual connector descriptions. Replacement accessories may be ordered separately. See pages 472 and 473.

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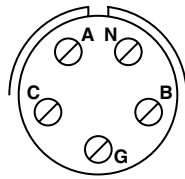
5015  
Crimp Rear  
Release  
Matrix

**22992**  
Class L

Back-  
Shells

Options  
Others

**Shell Size 28, 40 amp rating**



28-12, 28-13  
Three phase AC, 4 wire, grounding

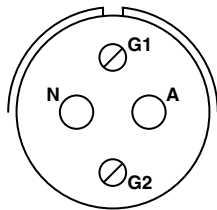
**Cable:**

28-12	IPCEA, type G, round, four #8 conductors
28-13	CO-04 HDF, (4-6-4/12R) 1090 per MIL-DTL-3432

**Contacts:**

Position	Size	Pin M39029/48	Socket M39029/49
A, B, C	6	-317	-329
N, G	6N	-318	-329

**Shell Size 32, 60 amp rating**



32-04, 32-05  
Single phase AC, 2 wire, grounding

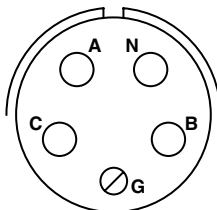
**Cable:**

32-04	IPCEA, type G, round, two #6 conductors
32-05	CO-02 HDF, (2/4-2/8R) 1100 per MIL-DTL-3432

**Contacts:**

Position	Size	Pin M39029/48	Socket M39029/49
A	4	-320	-331
N	4N	-321	-331
G1, G2	6N	-318	-329

**Shell Size 32, 60 amp rating**



32-12, 32-13  
Three phase AC, 4 wire, grounding

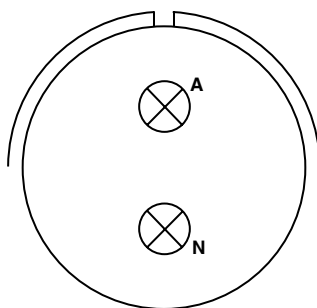
**Cable:**

32-12	IPCEA, type G, round, four #6 conductors
32-13	CO-04 HDF, (4/4-4/12R) 1290 per MIL-DTL-3432

**Contacts:**

Position	Size	Pin M39029/48	Socket M39029/49
A, B, C	4	-320	-331
N	4N	-321	-331
G	6N	-318	-329

**Shell Size 44, 100 amp rating**



44-02, 44-03  
28 Volts DC, 2 wire

**Cable:**

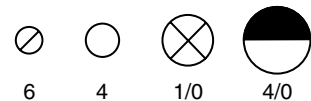
44-02	IPCEA, type W, round, two #2 conductors
44-03	CO-02 HDF, (2/1) 1385 per MIL-DTL-3432

**Contacts:**

Position	Size	Pin M39029/48	Socket M39029/49
A	1/0-1	-323	-333
N	1/0N-1	-324	-333

IPCEA – Insulated Power Cable Engineers Association

**Contact Legend**





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- III
- HD
- Dualok
- II
- I
- SJT
- Accessories
- Aquacon
- Herm/Seal
- PCB

- HIGH SPEED
- Fiber Optics
- Contacts Connectors Cables

- EMI Filter Transient
- 26482 Matrix 2
- 83723 III Matrix | Pyle
- 26500 Pyle

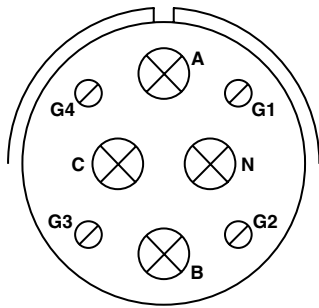
- 5015 Crimp Rear Release Matrix

22992 Class L

Back-Shell's

Options Others

## Shell Size 44, 100 amp rating



44-12, 44-13  
Three phase AC, 4 wire, grounding

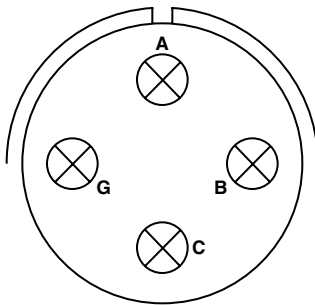
### Cable:

44-12	IPCEA, type G, round, four #2 conductors
44-13	CO-04 HDF, (4/1-4/8R) 1620 per MIL-DTL-3432

### Contacts:

Position	Size	Pin M39029/48	Socket M39029/49
A, B, C	1/0-1	-323	-333
N	1/0N-1	-324	-333
G1, G2, G3, G4	6G	-319	-330

## Shell Size 44, 100 amp rating For Navy Ground Support Equipment use only.



44-50, 44-51, 44-52, 44-56  
Three phase AC, 3 wire, grounding

44-50	Available in MS90555 & MS90558 only 4 each #1 conductors
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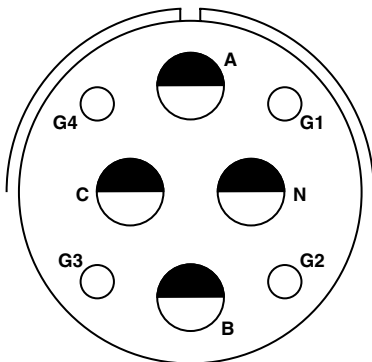
### Cable:

44-51	Available in MS90556 & MS90557 only IPCEA, type W, round, four #1 conductors
44-52	Available in MS90556 only IPCEA, type W, round, four #2 conductors
44-56	Available in MS90556 only IPCEA, type W, round, four #6 conductors

### Contacts:

Position	Size	Pin M39029/48	Socket M39029/49
A, B, C	1/0-1	-323	-333
G	1/0N-1	-324	-333

## Shell Size 52, 200 amp rating



52-12, 52-13  
Three phase AC, 4 wire, grounding

### Cable:

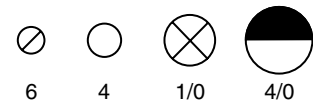
52-12	IPCEA, type G, round, four #4/0 conductors
52-13	CO-04 HDE, (4/0000-4/4R) 2380 per MIL-DTL-3432

### Contacts:

Position	Size	Pin M39029/48	Socket M39029/49
A, B, C	4/0	-327	-335
N	4/0N	-328	-335
G1, G2, G3, G4	4G	-322	-332

IPCEA – Insulated Power Cable Engineers Association

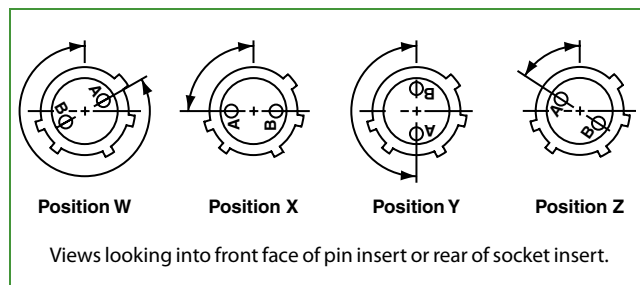
### Contact Legend



**Alternate Insert Rotations**

To avoid cross-plugging problems in applications requiring the use of more than one connector of the same size and arrangement, alternate insert rotations are available. As shown in the diagrams below, position W, X, Y and Z are possible rotations of the insert within Class L connectors. The front face of the pin insert is rotated within the shell in a clockwise direction from the normal shell key. The socket insert would be rotated counter-clockwise the same number of degrees in respect to the normal shell key.

See how to order on next page; the keying position letter W, X, Y or Z goes at the end of the part number.



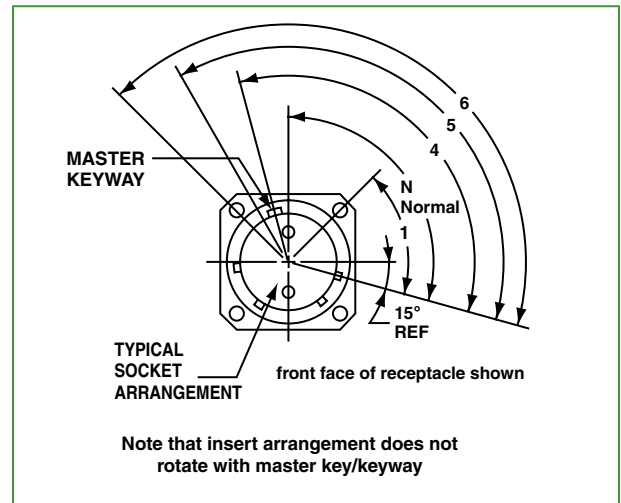
**Class L Insert Rotations**

Insert Arrangements	Keying Position (degrees from normal position)				
	DC or 60 Hz Normal	400 Hz			
		W	X	Y	Z
28-12	0	-	-	180	-
28-13	0	-	-	180	-
32-04	0	-	90	-	-
32-05	0	-	90	-	-
32-12	0	-	-	180	-
32-13	0	-	-	180	-
44-12	0	-	-	-	60
44-13	0	-	-	-	60
44-50	0	-	-	-	-
44-51	0	-	-	-	-
44-52	0	-	-	-	-
44-56	0	-	-	-	-
52-12	0	300	-	-	-
52-13	0	300	-	-	-

**Alternate Master Key/Keyway Rotations**

Another option for preventing cross-mating of incompatible connector voltages is to choose an alternate rotation of the key/keyway positions of the connector shell. The diagram below shows positions 1, 4, 5 and 6 for the master key/keyway.

See how to order on next page; the alternate master key/keyway position is Step 4 in building a part number.



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26500  
Pyle

5015  
Crimp Rear Release Matrix

22992  
Class L

Back-Shells

Options  
Others

### Easy Steps to build a part number... Class L Series

1.	2.	3.	4.	5.	6.	7.
MS Number	Shell Finish	Shell Size	Alternate Master Key/Keyway Position	Insert Arrangement	Contact Type	Alternate Insert Rotation
MS90555	C	32	4	12	S	Y
Commercial Number	Shell Finish	Shell Size	Alternate Master Key/Keyway Position	Insert Arrangement	Contact Type	Alternate Insert Rotation
CL90555*	C	32	4	12	S	Y

**Step 1. Select a MS Number**

	Designates
MS90555	Wall Mount Receptacle ( <i>Power Source</i> )
MS90556	Straight Plug
MS90557	Cable Connecting Receptacle without Coupling Ring
MS90558	Wall Mount Plug with Coupling Ring ( <i>Equipment End</i> )

**Step 1. Select a Commercial Number**

	Designates
CL90555	Wall Mount Receptacle ( <i>Power Source</i> )
CL90556	Straight Plug
CL90557	Cable Connecting Receptacle without Coupling Ring
CL90558	Wall Mount Plug with Coupling Ring ( <i>Equipment End</i> )

**Step 2. Select a Shell Finish**

	Designates
C	Conductive for AC circuits
N	Non-conductive for DC circuits

#### Grounding Assemblies: Finish C

Shell Size	Current Rating Amps	Shell Master Key/Keyway Position						
		60Hz & 400 Hz						
		1 Phase			3 Phase			
		2 Wire		3 Wire	3 Wire	4 Wire		
		120 VAC	240 VAC	120/240 VAC	450/480 VAC	120/208 VAC	240/416 VAC	277/480 VAC
28	40	4 (120°)	5 (135°)	4 (120°)	–	4 (120°)	5 (135°)	6 (150°)
32	60	4 (120°)	5 (135°)	4 (120°)	–	4 (120°)	5 (135°)	6 (150°)
44	100	4 (120°)	–	4 (120°)	1 (60°)	4 (120°)	5 (135°)	6 (150°)
52	200	–	–	4 (120°)	–	4 (120°)	5 (135°)	6 (150°)

#### Non-grounding Assemblies: Finish N

Shell Size	Current Rating Amps	Shell Master Key/Keyway Position
		DC
		2 Wire
		28 VDC
28	40	N (105°)
32	60	N (105°)
44	100	N (105°)
52	200	N (105°)

**Step 3. Select a Shell Size - (related directly to current carrying capability)**

	Designates Current Carrying Capability
28	40 amperes
32	60 amperes
44	100 amperes
52	200 amperes

**Step 4. Select an Alternate Master Key/Keyway Position if needed**

N designates normal position. Positions 1, 4, 5 and 6 of the master key/keyway prevent cross-mating of incompatible voltages. See diagram on page 466.

**Step 5. Select an Insert Arrangement**

See pages 464-465 for available insert arrangements for Class L connectors.

Insert arrangements are determined by connector size (current carrying capability) and cable configuration to be accommodated.

**Step 6. Select a Contact Type**

	Designates
P	Pin Contacts
S	Socket Contacts

MS90555/CL90555 and MS90557/CL90557 are supplied with socket contacts only. MS90556/CL90556 and MS90558/CL90558 are supplied with pin contacts only.

\*Commercial Numbers are supplied less protection caps and strain reliefs which can be added separately.

**Step 7. Select an Alternate Insert Rotation if needed**

Used to prevent cross-mating of incompatible frequencies.

Absence of a letter in this space indicates Normal (0°) position of the insert. Refer to page 466.

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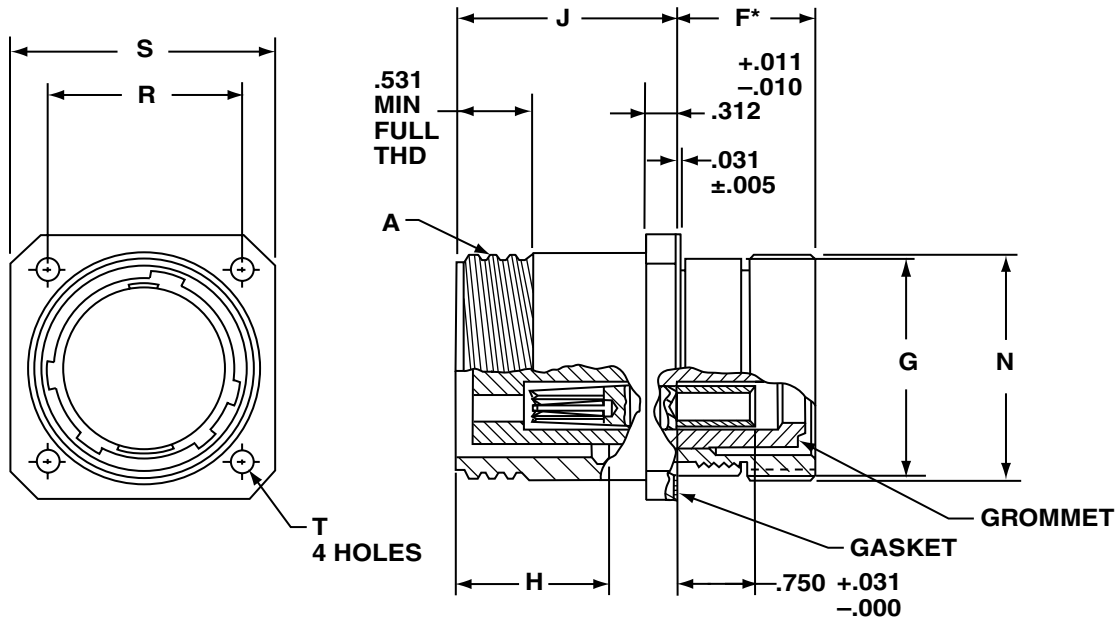
22992  
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Others

**PART #** To complete, see how to order page 467.

Part Number	Shell Finish	Shell Size	Master Key/Keyway Position	Insert Arrangement	Contact Type	Alternate Insert Rotation
MS90555	C or N	XX	X	XX	P or S	X
CL90555**	C or N	XX	X	XX	P or S	X



Shell Size	A Thread Class 2A .1428P-.2857L Double Stub	F* ±.031	G Dia. +.006 -.010	H ±.005	J +.016 -.000	N Dia. +.011 -.020	R (BSC)	S +.021 -.020	T Dia. ±.005
28	2.000	1.376	1.938	1.514	2.188	2.000	1.844	2.375	.177
32	2.250	1.376	2.188	1.514	2.188	2.250	2.062	2.625	.209
44	3.000	1.438	3.062	1.733	2.532	3.125	2.812	3.375	.281
52	3.500	1.438	3.562	1.733	2.532	3.625	3.156	3.875	.281

All dimensions for reference only.

Protective cover MS90563 is supplied as part of this connector assembly. Refer to page 473 for dimensions.

\*F dimension applies only when rear nut is fully tightened.

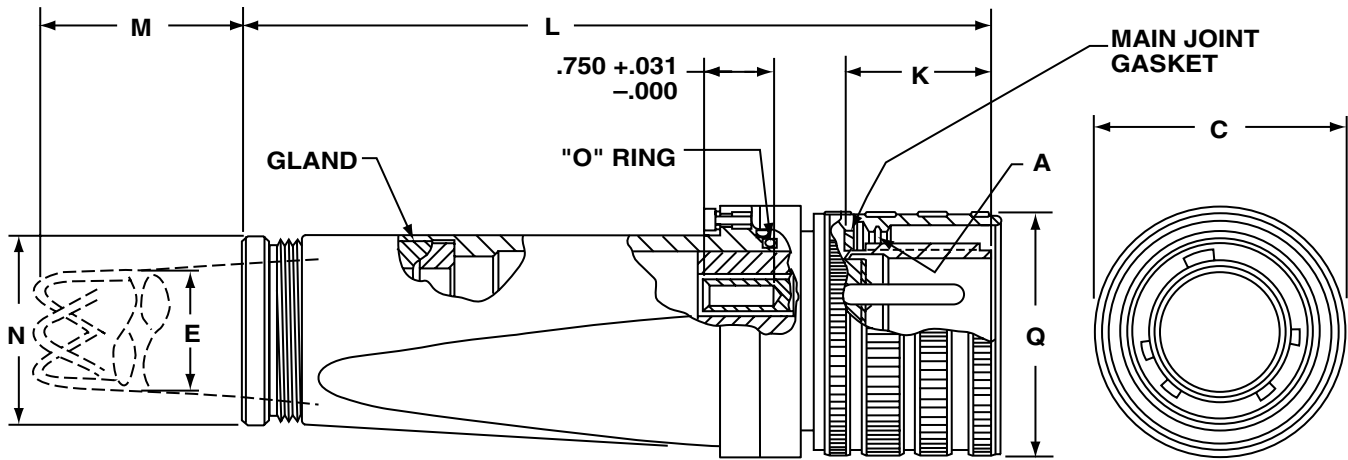
\*\*Commercial Numbers are supplied less protection caps and strain reliefs which can be added separately.



# MS (CL) 90556, MIL-DTL-22992, Class L Straight Plug

**PART #** To complete, see how to order page 467.

Part Number	Shell Finish	Shell Size	Master Key/Keyway Position	Insert Arrangement	Contact Type	Alternate Insert Rotation
MS90556	C or N	XX	X	XX	P or S	X
CL90556*	C or N	XX	X	XX	P or S	X



Shell Size and Arrangement	A Thread Class 2A .1428P-.2857L Double Stub	C Dia. Max.	E Cable Range	K ±.005	L Max. Free Length	M Approx. Free Length	N Dia. +.011 - .020	Q Dia. Max.
28-12	2.000	2.439	1.047-.922	1.557	8.188	7.188	2.000	2.312
28-13			1.130-1.005			7.188		
32-04	2.250	2.689	.969-.844	1.557	8.188	7.188	2.000	2.562
32-05, 32-12			1.130-1.005			7.188		
32-13			1.342-1.217			8.688		
44-02	3.000	3.667	1.312-1.187	1.776	10.172	10.688	2.500	3.531
44-03			1.438-1.313			9.688		
44-12			1.516-1.391			10.688		
44-13			1.672-1.547			12.688		
44-51	3.000	3.667	1.734-1.609	1.776	10.172	11.688	2.500	3.531
44-52			1.525-1.435			11.188		
44-56			1.135-1.065			7.188		
52-12	3.500	4.167	2.328-2.183	1.776	11.109	17.188	3.250	4.016
52-13			2.453-2.308			18.188		

All dimensions for reference only.

Protective cover MS90564 is supplied as part of this connector assembly. Refer to page 473 for dimensions.

Contact bushings MS3348 are supplied as part of connector as required. Refer to page 472 for dimensions.

\*Commercial Numbers are supplied less protection caps and strain reliefs which can be added separately.

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26500 Pyle

5015 Crimp Rear Release Matrix

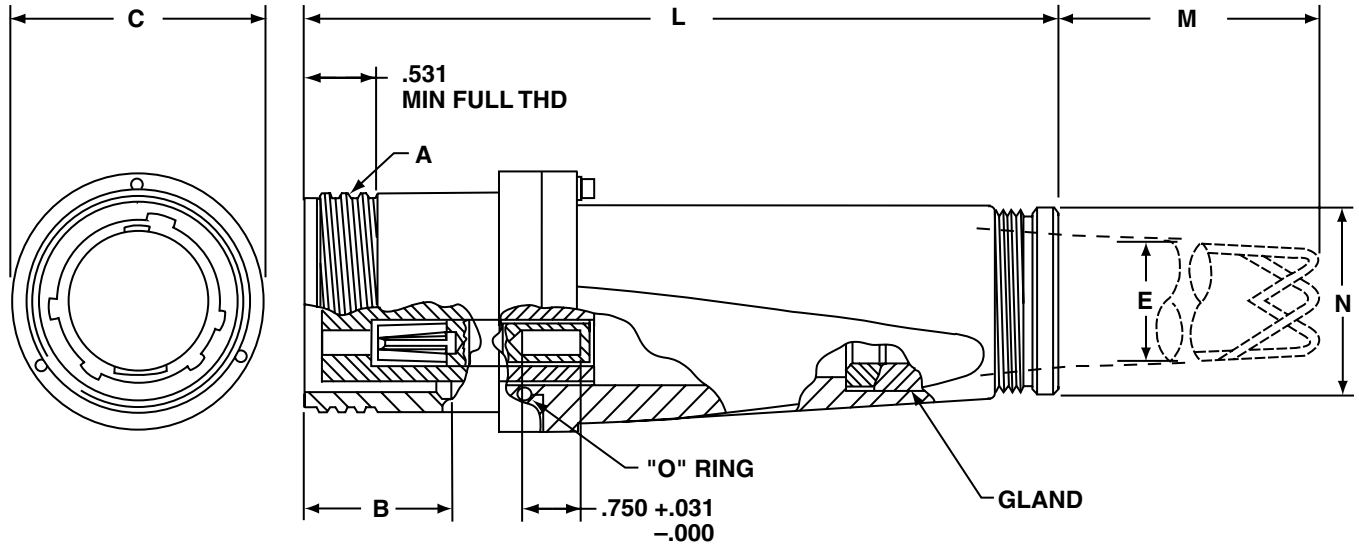
22992 Class L

Back-Shells

Options Others

**PART #** To complete, see how to order page 467.

Part Number	Shell Finish	Shell Size	Master Key/Keyway Position	Insert Arrangement	Contact Type	Alternate Insert Rotation
MS90557	C or N	XX	X	XX	P or S	X
CL90557*	C or N	XX	X	XX	P or S	X



Shell Size and Arrangement	A Thread Class 2A .1428P-.2857L Double Stub	B ±.005	C Dia. Max.	E Cable Range	L Max. Free Length	M Approx. Free Length	N Dia. +.011 -.020
28-12	2.000	1.514	2.439	1.047-.922	8.156	7.188	2.000
28-13				1.130-1.005		7.188	
32-04	2.250	1.514	2.689	.969-.844	8.156	7.188	2.000
32-05, 32-12				1.130-1.005		7.188	
32-13				1.342-1.217		8.688	
44-02	3.000	1.733	3.667	1.312-1.187	10.125	10.688	2.500
44-03				1.438-1.313		9.688	
44-12				1.516-1.391		10.688	
44-13				1.672-1.547		12.688	
44-51				1.734-1.609		11.688	
52-12	3.500	1.733	4.167	2.328-2.183	11.062	17.188	3.250
52-13				2.453-2.308		18.188	

All dimensions for reference only.

Protective cover MS90563 is supplied as part of this connector assembly. Refer to page 473 for dimensions.

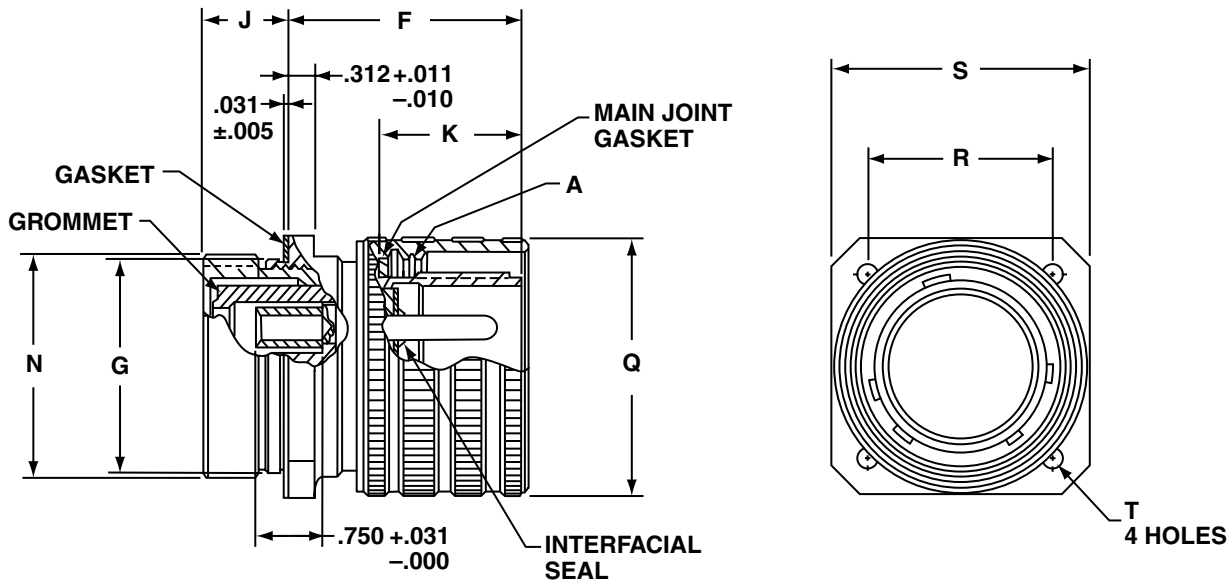
Contact bushings MS3348 are supplied as part of connector as required. Refer to page 472 for dimensions.

\*Commercial Numbers are supplied less protection caps and strain reliefs which can be added separately.

# MS (CL) 90558, MIL-DTL-22992, Class L Wall Mount Plug with Coupling Ring (equipment end)

**PART #** To complete, see how to order page 467.

Part Number	Shell Finish	Shell Size	Master Key/Keyway Position	Insert Arrangement	Contact Type	Alternate Insert Rotation
MS90558	C or N	XX	X	XX	P or S	X
CL90558**	C or N	XX	X	XX	P or S	X



Shell Size	A Thread Class 2A .1428P-.2857L Double Stub	F* +.016 / -.000	G Dia. +.006 / -.010	J ±.031	K ±.005	N Dia. +.011 / -.020	Q Dia. Max.	R (BSC)	S +.021 / -.020	T Dia. ±.005
28	2.000	2.639	1.938	.959	1.557	2.000	2.312	1.844	2.375	.177
32	2.250	2.639	2.188	.959	1.557	2.250	2.562	2.062	2.625	.209
44	3.000	2.998	3.062	1.021	1.776	3.125	3.531	2.812	3.375	.281
52	3.500	2.998	3.562	1.021	1.776	3.625	4.016	3.156	3.875	.281

All dimensions for reference only.

Protective cover MS90564 is supplied as part of this connector assembly. Refer to page 473 for dimensions.

\*F dimension applies only when rear nut is fully tightened.

\*\*Commercial Numbers are supplied less protection caps and strain reliefs which can be added separately.

38999

III

HD

Dualok

II

I

SJT

Accessories

Aquacon

Herm/Seal

PCB

HIGH SPEED

Fiber Optics

Contacts  
Connectors  
Cables

EMI Filter  
Transient

26482  
Matrix 2

83723 III  
Matrix | Pyle

26500  
Pyle

5015  
Crimp Rear Release Matrix

22992  
Class L

Back-Shell

Options  
Others

38999  
III  
HD  
Dualok  
II  
I  
SJT  
Accessories  
Aquacon  
Herm/Seal  
PCB

HIGH SPEED  
Fiber Optics  
Contacts  
Connectors  
Cables

EMI Filter  
Transient

26482  
Matrix 2

83723 III  
Matrix | Pyle

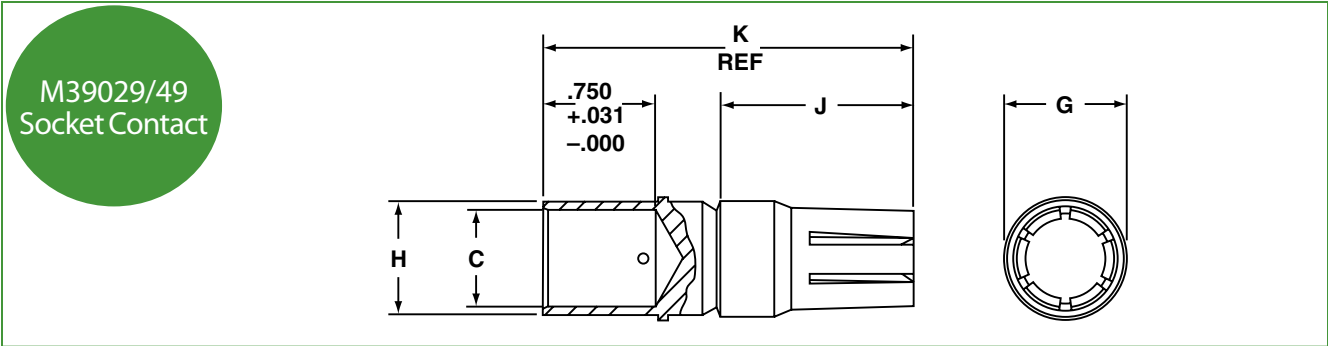
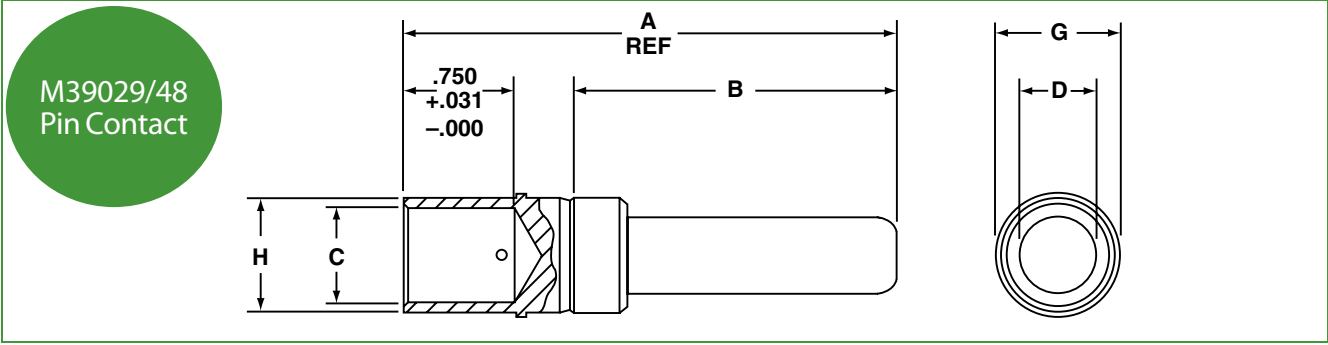
26500  
Pyle

5015  
Crimp Rear Release Matrix

22992  
Class L

Back-Shells

Options  
Others



Order Replacement Contacts by MS part number listed below for either Socket or Pin:

Socket MS Part Number	Pin MS Part Number	Contact Size	Wire Well Size	A Ref.	B ±.005	C Dia.	D Dia. ±.001	G Dia.	H Dia.	J ±.005	K Ref.
M39029/49-335	M39029/48-327	4/0	4/0	3.207	2.097	.641 +.004 -0.003	.500	.781 ±0.003	.750 +.004 -0.003	1.283	2.393
-	M39029/48-328	4/0N	4/0	3.325	2.215	.641 +.004 -0.003	.500	.781 ±0.003	.750 +.004 -0.003	-	-
M39029/49-333	M39029/48-323	1/0	1	3.207	2.097	.406 +.004 -0.003	.357	.609 ±0.003	.506 +.004 -0.003	1.283	2.393
-	M39029/48-324	1/0N	1	3.325	2.215	.406 +.004 -0.003	.357	.609 ±0.003	.506 +.004 -0.003	-	-
M39029/49-331	M39029/48-320	4	4	2.786	1.738	.281 ±0.002	.225	.417 ±0.002	.374 ±0.002	1.158	2.206
-	M39029/48-321	4N	4	2.904	1.856	.281 ±0.002	.225	.417 ±0.002	.374 ±0.002	-	-
M39029/49-329	M39029/48-317	6	6	2.786	1.738	.234 ±0.002	.178	.342 ±0.002	.312 ±0.002	1.158	2.206
-	M39029/48-318	6N	6	2.904	1.856	.234 ±0.002	.178	.342 ±0.002	.312 ±0.002	-	-
M39029/49-332	M39029/48-322	4G	4	2.856	1.756	.281 ±0.002	.225	.417 ±0.002	.374 ±0.002	1.752	2.862
M39029/49-330	M39029/48-319	6G	6	2.856	1.746	.234 ±0.002	.178	.342 ±0.002	.312 ±0.002	1.752	2.862



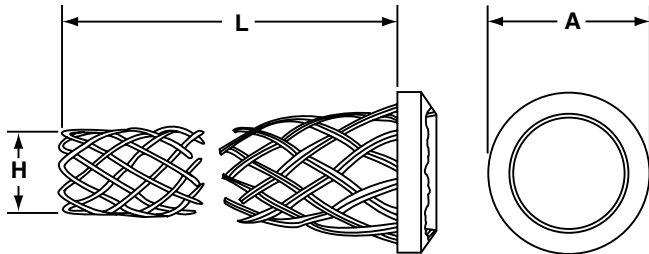
Order Contact Bushings by MS part number listed below:

MS Part Number	Contact Wire Barrel Size (Ref)	Wire Size (Ref)	A Dia. +.010 -0.003	B Dia. +.002 -0.003
MS3348-1-2L	1	2	.359	.396
MS3348-4-5L	4	5	.250	.272
MS3348-4-6L	4	6	.225	.272
MS3348-6-8L	6	8	.185	.225
MS3348-6-9L	6	9	.155	.225
MS3348-1-6L	1	6	.225	.396
MS3348-4-8L	4	8	.185	.272
MS3348-6-10L	6	10	.136	.225
MS3348-4/0-2/0L	4/0	2/0	.500	.629

See page 476 and 477 for information on Contact Removal Tools for Class L connectors.

All dimensions for reference only.

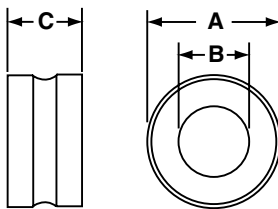
### MS90561 Cable Strain Relief



Order Strain Reliefs by MS part number listed below:

MS Part Number	Arrangement Number	A Dia. +.000 - .010	H Dia. Cable Range		L Approx.
			Max.	Min.	
MS90561-2	28-13, 32-12	1.797	1.145	1.003	8.000
MS90561-4	28-02, -28-04	1.797	.844	.688	7.500
MS90561-12	28-12	1.797	1.047	.891	8.000
MS90561-13	32-13	1.797	1.342	1.185	9.500
MS90561-15	44-12	2.235	1.516	1.360	11.500
MS90561-16	44-13	2.235	1.688	1.531	13.500
MS90561-17	52-12	2.922	2.328	2.039	18.000
MS90561-18	52-13	2.922	2.500	2.211	19.000
MS90561-19	44-51	2.235	1.750	1.550	12.500
MS90561-20	44-52	2.235	1.578	1.375	12.000
MS90561-21	44-56	2.235	1.160	1.010	8.000

### MS23747 Cable Sealing Gland



Order Cable Sealing Glands by MS part number listed below:

MS Part Number	Arrangement Number	A Dia. +.000 - .020	B Dia. +.020 - .000	C ±.010	Min Cable Dia. Ref.
MS23747-2	28-13, 32-05, 32-12	1.805	1.130	1.034	1.005
MS23747-12	28-12	1.805	1.047	1.034	.922
MS23747-13	32-13	1.805	1.342	1.034	1.217
MS23747-14	44-03	2.242	1.438	1.160	1.313
MS23747-15	44-12	2.242	1.516	1.160	1.391
MS23747-16	44-13	2.242	1.672	1.160	1.547
MS23747-18	52-12	2.927	2.328	1.284	2.183
MS23747-19	52-13	2.927	2.453	1.284	2.308
MS23747-20	44-51	2.242	1.734	1.160	1.609
MS23747-21	44-52	2.242	1.562	1.160	1.437
MS23747-22	44-56	2.242	1.150	1.160	1.025

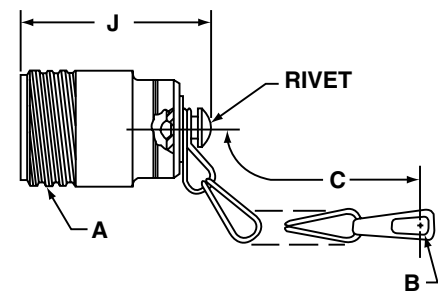
### Protection Caps

Order Protection Caps by MS part number listed in charts below. To complete the MS part number add letter C (Conductive) for AC or N (Non-Conductive) for DC connector assemblies.

All dimensions for reference only.

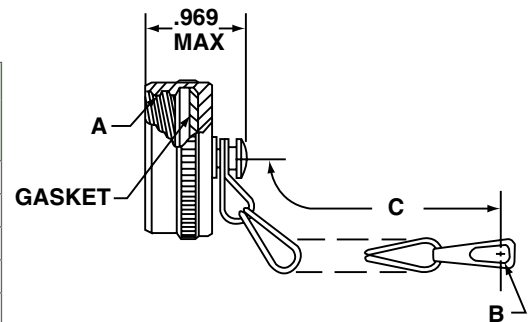
#### MS90563 Protection Caps used with MS90555 Wall Mount Receptacle, MS90557 Cable Connecting Receptacle

MS Part Number	Use with Shell Size	A Thread Class 2B .1428P-.2857L Double Stub	B Dia. Ref.		C Approx.
			For MS90555	For MS90557	
MS90563-1( )	28	2.000	.177	.177	6.000
MS90563-3( )	32	2.250	.209	-	4.500
MS90563-4( )	32	2.250	-	.177	6.000
MS90563-7( )	44	3.000	.281	.281	7.500
MS90563-11( )	52	3.500	.281	.281	7.500



#### MS90564 Protection Caps used with MS90556 Straight Plug, MS90558 Wall Mount Plug

MS Part Number	Use with Shell Size	A Thread Class 2B .1428P-.2857L Double Stub	B Dia. Ref.		C Approx.	J Max.
			For MS90556	For MS90558		
MS90564-1( )	28	2.000	.177	.177	7.500	2.266
MS90564-3( )	32	2.250	-	.209	6.000	2.266
MS90564-4( )	32	2.250	.177	-	7.500	2.266
MS90564-7( )	44	3.000	.281	.281	8.500	2.484
MS90564-11( )	52	3.500	.281	.281	8.500	2.484



38999

III  
HD  
Dualok  
II  
I  
SJT  
Accessories  
Aquacon  
Herm/Seal  
PCB

HIGH SPEED

Fiber Optics  
Contacts  
Connectors  
Cables

EMI Filter  
Transient

26482  
Matrix 2

83723 III  
Matrix | Pyle

26500  
Pyle

5015  
Crimp Rear Release Matrix

22992  
Class 1

Back-Shell's

Options  
Others



Complete installation instructions (L-1014) for Class L connectors are available online at [www.amphenol-aerospace.com](http://www.amphenol-aerospace.com)

The following pages are condensed assembly instructions to familiarize the user with the installation procedure and tooling required.

### Cable Preparation

(MS90556 and MS90557 connectors only)

The following table shows the standard wire color coding, generator terminal markings, and connector contact identification used with Class L connectors.

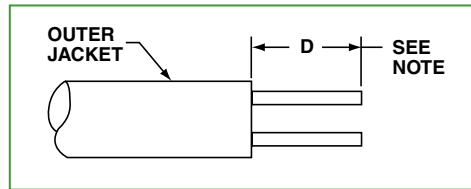
**Standardized Generator Wiring and Connections**

Generator Terminal Marking	Current	Contact Designation	Conductor Circuit	Wire Color
+ (POS)	28Vdc	A	Positive	Black
- (NEG) ground	28Vdc	N	Negative	White
L <sub>1</sub>	AC	A	Phase A	Black
L <sub>2</sub>	AC	B	Phase B	Red
L <sub>3</sub>	AC	C	Phase C	Blue (Commercial may be orange)
L <sub>0</sub>	AC	N	Neutral	White
G (or Gnd)	AC	G	Safety grounding	Green (Commercial may be bare)

**Step 1)** Determine cable lay to facilitate alignment of contacts and insert holes without wire crossing.

**Step 2)** Strip cable jacket to dimension shown. Avoid cutting or nicking individual conductor insulation.

Connector Size	D Inches Approx.
28	3.000
32	3.000
44	4.250
52	5.000



NOTE: Some insert arrangements require that two or more ground wires are terminated into one contact. Dimension D must therefore be increased to permit routing these wires around the larger conductors.

**Step 3)** Install connector components in the order shown in the applicable assembly view illustrated on pages 475 and 476.

**Step 4)** Strip insulation of individual conductors to 3/4 inch from end of connector.

- 38999
- III
- HD
- Dualok
- II
- I
- SJT
- Accessories
- Aquacon
- Herm/Seal
- PCB
- HIGH SPEED
- Fiber Optics
- Contacts Connectors Cables
- EMI Filter Transient
- 26482 Matrix 2
- 83723 III Matrix | Pyle
- 26500 Pyle
- 5015 Crimp Rear Release Matrix
- 22992 Class L
- Back-Shells
- Options Others

38999

III
HD
Duallok
II
I
SJT
Accessories
Aquacon
Herm/Seal
PCB

HIGH SPEED
Fiber Optics
Contacts
Connectors
Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix   Pyle

26500
Pyle

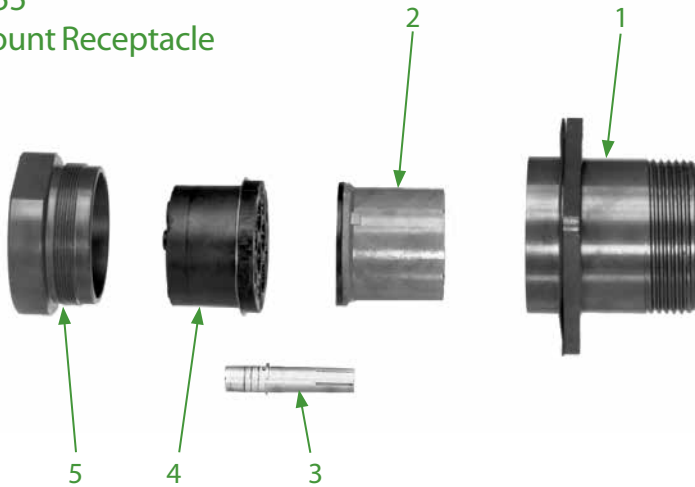
5015
Crimp Rear Release Matrix

22992
Class L

Back-Shell's
--------------

Options
Others

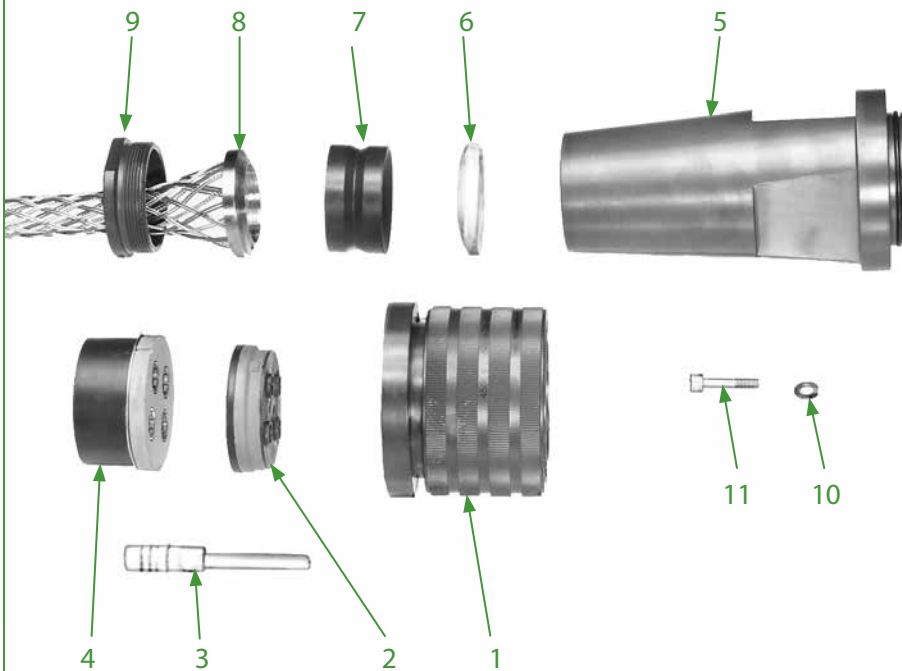
**MS90555**  
Wall Mount Receptacle



Wall Mount Receptacle  
Components:

1. Shell
2. Insert Assembly, Socket
3. Contact, Socket
4. Grommet Assembly, Socket
5. Nut, Retaining
6. Protective Cap Assembly (not shown)
7. Flange Gasket (not shown)

**MS90556**  
Straight Plug



Straight Plug Components:

1. Shell & Coupling Nut Assembly
2. Insert Assembly, Pin
3. Contact, Pin
4. Spacer Assembly, Pin
5. Back Adapter
6. Gland Washer
7. Gland
8. Cable Grip
9. Gland Nut
10. Lockwasher (3 each)
11. Screw (3 each)
12. Protective Cap Assembly (not shown)

NOTE: On shell size 32 connectors, item #6 (gland washer) is contained within item #5 (back adapter).

38999

III  
HD  
Dualok  
II  
I  
SJT  
Accessories  
Aquacon  
Herm/Seal  
PCB

HIGH  
SPEED

Fiber  
Optics  
Contacts  
Connectors  
Cables

EMI Filter  
Transient

26482  
Matrix 2

83723 III  
Matrix | Pyle

26500  
Pyle

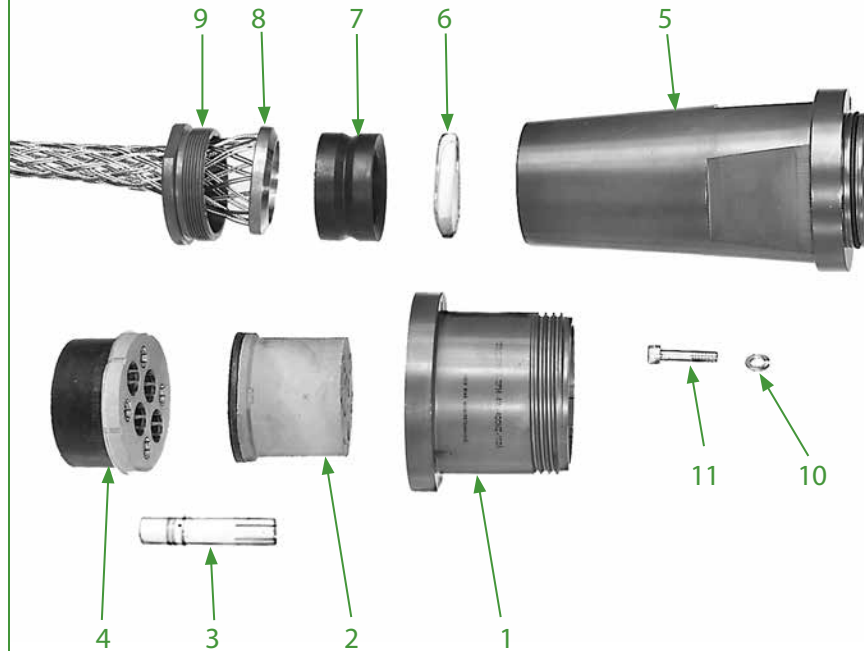
5015  
Crimp Rear  
Release  
Matrix

22992  
Class L

Back-  
Shells

Options  
Others

**MS90557**  
Cable Connecting Receptacle

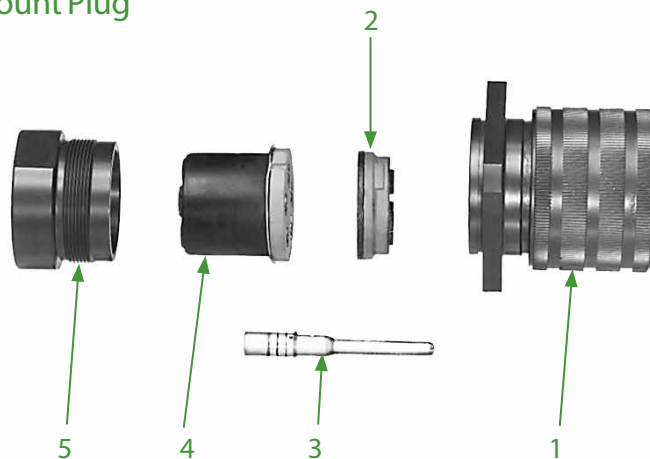


Cable Connecting Receptacle  
Components:

1. Shell
2. Insert Assembly, Socket
3. Contact, Socket
4. Spacer Assembly, Socket
5. Back Adapter
6. Gland Washer
7. Gland
8. Cable Grip
9. Gland Nut
10. Lockwasher (3 each)
11. Screw (3 each)
12. Protective Cap Assembly (not shown)

NOTE: On shell size 32 connectors, item #6 (gland washer) is contained within item #5 (back adapter).

**MS90558**  
Wall Mount Plug



Wall Mount Plug Components:

1. Shell & Coupling Nut Assembly
2. Insert Assembly, Socket
3. Contact, Pin
4. Grommet Assembly, Pin
5. Nut, Retaining
6. Protective Cap Assembly (not shown)
7. Flange Gasket (not shown)

### Contact Installation

- Step 1)** Insert stripped conductors in contact wirewells. If contact bushing is used, insert conductor in bushing and bushing in contact wirewell. If two or more ground wires are inserted into a single contact, make sure all wires are fully seated in wirewell.
- Step 2)** Select correct crimping tool, locator and die combination from the table for contacts to be installed. With conductor or contact bushing in place, insert contact into tool. Close crimping die fully to form a uniform crimp.

Contact Part Number	Size	Type	Crimping Tool*	Locator*	Die*	Removal Tool
M39029/48-327 M39029/49-335 M39029/48-328	4/0 4/0 4/0N	P S P	Pico Model 400B or 400B-1	4297-1	414DA-4/0N-1	MS90562-1
M39029/48-323 M39029/49-333 M39029/48-324	1/0 1/0 1/0N	P S P	Pico Model 400B or 400B-1	4297-3	414DA-1/0N	MS90562-3
M39029/48-320 M39029/49-331 M39029/48-321 M39029/48-322 M39029/49-332	4 4 4N 4G 4G	P S P P S	Pico Model 400B or 400B-1	4297-5	414DA-4N	MS90562-5
M39029/48-317 M39029/49-329 M39029/48-318 M39029/48-319 M39029/49-330	6 6 6N 6G 6G	P S P P S	Pico Model 400B or 400B-1	4297-6	414DA-6N	MS90562-6

\* Available from Pico Crimping Tools Co.,  
9832 Jersey Ave., Santa Fe Springs, Ca  
90670  
Phone: 805-388-5510

If crimping tools are available, contacts may be affixed to conductors by soldering. Use rosin-alcohol solder flux, a good grade of 60/40 solder and a 500 watt soldering iron or probe type resistance soldering equipment. Pre-tin conductors before soldering. Solder must not be present on shoulder or retention area of contact.

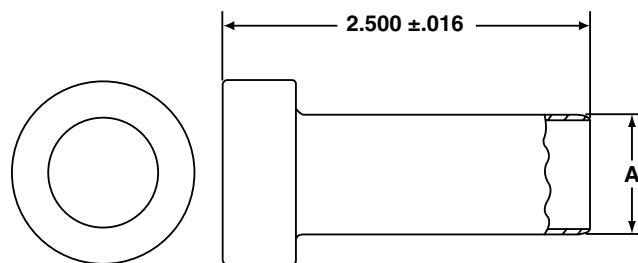
### Connector Assembly

- Step 1)** If inserts are not already positioned in the connector shell, align large tab on insert with large slot in shell and push insert in until it bottoms in shell.
- Step 2)** Apply a thin coating of Dow Corning DC-4 lubricant to the periphery of contact holes in spacer or grommet assembly. Push contacts into rear of spacer or grommet assembly until locked into contact retainer bushing.
- Step 3)** Align contacts with proper holes in insert. Small key of insert must be aligned with appropriate keyway in spacer or grommet assembly. Slide contacts into insert holes until spacer or grommet assembly butts against insert. A thin film of Dow Corning DC-4 lubricant applied to the periphery of insert contact holes will provide maximum sealing efficiency.
- Step 4)** Assemble accessories to connector. The back adapter "O" ring should have a very thin film of Dow Corning DC-4 lubricant applied. Outer surfaces only of gland should be lubricated with a thin film of UniTemp Grease EP. Avoid getting grease on inside surfaces of gland and on cable jacket.
- Step 5)** Tighten retaining nut or gland nut on shell or adapter. A metal-to-metal seating condition is desirable, but may not be attainable with maximum cable diameters.

### Contact Removal

- Step 1)** Loosen all rear accessories and slide back along cable.
- Step 2)** Remove spacer or grommet assembly with contacts from connector insert.
- Step 3)** Using the appropriate size contact removal tool, push tool over front of contact until it bottoms in spacer or grommet assembly hole. This will open contact retaining bushing and allow contact to be removed from the spacer or grommet assembly from the rear. When using jacketed cable, all contacts should be released from contact retention bushings before removal from spacer or grommet assembly is accomplished.

MS90562 Contact Removal Tool



Order MS90562 contact Removal Tool by MS part number listed below:

MS Part Number	Contact Size	A Dia. +.000 -.002
M81969/27-01	4/0	.790
M81969/27-02	2/0	.696
M81969/27-03	1/0	.558
M81969/27-04	2	.462
M81969/27-05	4	.376
M81969/27-06	6	.354

All dimensions for reference only.

38999

III
HD
Dualok
II
I
SJT
Accessories
Aquacon
Herm/Seal
PCB

HIGH SPEED
Fiber Optics
Contacts Connectors Cables

EMI Filter  
Transient

26482  
Matrix 2

83723 III  
Matrix | Pyle

26500  
Pyle

5015  
Crimp Rear Release Matrix

22992  
Class L

Back-Shell's

Options Others